

AF/1725
J-FW



MAIL STOP APPEAL BRIEF-PATENT
PATENT
0503-1047

IN THE U.S. PATENT AND TRADEMARK OFFICE BEFORE
THE BOARD OF PATENT APPEALS AND INTERFERENCES

METHOD AND APPARATUS FOR THE LASER CUTTING OF STAINLESS STEEL, COATED STEEL, ALUMINUM OR ALUMINUM ALLOYS WITH A BIFOCAL OPTICAL COMPONENT

REPLY BRIEF

MAY IT PLEASE YOUR HONORS: September 28, 2004

In accordance with 37 C.F.R. §1.197(b1), Appellant responds to the Examiner's Answer of July 28, 2004 as follows:

At the outset, Appellants maintain all of the positions taken throughout prosecution and most recently in the brief filed May 24, 2004. Appellant will, in the present Reply Brief, address those points that have been directly raised in the Examiner's Answer and to which a response is demanded to present a clear picture for the Board.

The Examiner's Answer takes the position that the NEILSEN reference does not teach away from the exclusive use of oxygen or the exclusive use of nitrogen as an assist gas. The

Examiner characterizes such description in NEILSEN as merely a reference to that which is typical for particular materials.

Appellant notes, however, that the descriptions of oxygen and nitrogen as assist gasses are presented clearly as alternatives to one another, and the "or" separating the description of such gases in column 2, line 55 is clearly most properly interpreted as an exclusive or, versus the and/or interpretation necessary for the NEILSEN reference to be properly construed as not teaching away from the combination of such gases. Appellant's position is supported by the fact that the identified text in NEILSEN does not merely state that oxygen or nitrogen may be used as an assist gas in connection with laser cutting, but further identifies the result produced by the use of the respective gasses and the metal for which such result is appropriate.

Specifically, NEILSEN teaches that oxygen is to be used in connection with ordinary steel, and such association with ordinary steel is not arbitrary. Instead, oxygen is used in connection with ordinary steel which is to be burnt away, known in the art to be the appropriate approach for addressing the issue of slag in laser cutting. In contrast, nitrogen is taught in connection with stainless steel precisely because it is an inert gas and, in contrast to promoting burning as is the case with oxygen, instead promotes melting. This also is understood

in the art to be the approach necessary to be taken with stainless steel, in contrast to ordinary steel.

Accordingly, the NEILSEN reference not only points out in passing that oxygen and nitrogen are available alternatives for use as assist gas, but specifically identifies the distinct characteristics of the cutting action produced by a laser associated with each gas. As the NEILSEN reference teaches, oxygen promotes burning, not melting, and nitrogen promotes melting, not burning. Given the teachings of NEILSEN, using the multi-focal lens described by such reference in connection with a nitrogen-oxygen mixture would produce an apparently unworkable combination of melting and burning, which would not appear to one skill in the art to be a viable alternative.

Page 5 of the Examiner's Answer states, in connection with claims 7 and 30, that the NEILSEN reference "teaches the workpiece can be as high as 15mm".

At the outset, Appellants note that the statement that the NEILSEN reference "teaches the workpiece can be as high as 15 mm" is entirely inaccurate. In fact, the NEILSEN reference does not teach "the work piece can be as high as 15 mm", but instead states that the work piece can be "15 mm or more", exactly the opposite of the Examiner's interpretation.

The Examiner's answer then takes the further position that "it would have been obvious to one of ordinary skill in the art at the time of the invention to decrease the thickness of the

work-piece to be cut between 1.5 and 5mm in order to minimize slag and increase the cut quality". In support of this, the Examiner's Answer makes specific reference to column 1, line 30-37 of NEILSEN. Appellant respectfully suggests that this constitutes result-based analysis and cannot reasonably be considered as the basis for considering the applied NEILSEN and ROLF et al. references to teach or suggest the subject matter of the identified claims 7 and 30.

In column 1, lines 27-30, the NEILSEN reference states "A growing demand has applied within the material processing industry employing lasers for a possibility of cutting in thick plates, such as steel plates of a thickness of 15 mm or more." From this, we know that the NEILSEN reference considers thick plates to be those having a thickness having 15 mm or more.

Beginning on line 41, the NEILSEN reference goes on to state, as part of the summary of the disclose invention of such reference: "The object of the invention is to provide a method of processing material by means of a laser, which ensures an improved processing quality in connection with thick materials." NEILSEN therefore specifically states that the use of a multi-focus laser for laser cutting of metals is for particular applications. Such applications are limited to thick materials, with "thick materials" defined as being those of 15 mm in thickness or more.

In addition to such explicit statement of the applicability of this reference, it is intuitive to one of skill in the art that the use of a laser beam having a plurality of focal points arranged along an optical axis is of benefit in connection with comparatively thick materials. By way of analogy to a knife, a laser utilizing optics producing a series of focal points arranged along the optical axis is analogous to a longer blade, and a longer blade is clearly advantageous for cutting thicker materials.

In light of the contradiction between the stated applicability of the plural focal points of the NEILSEN laser only to thick workpieces, the Examiner's Answer attempts to overcome this feature of NEILSEN by explaining that all that is necessary to apply the multi-focus laser to a thin workpiece of 1.5 to 5 mm thickness is simply to decrease the thickness of the workpiece. This points out an utterly flawed analysis that seeks to force fit the teachings of the references to the invention as claimed.

One cannot change the thickness of the workpiece for the stated motivation "to minimize slag and to increase the cut quality". In an industrial application, the thickness of the workpiece is a function of the ultimate use of the workpiece, not the convenience of the available tool. Moreover, the stated decrease in thickness of the renders the entire reason for the NEILSEN invention a nullity.

As the NEILSEN reference quite clearly states, sometimes it is necessary to cut thick (greater than 15 mm) pieces of steel, and in these situations it is appropriate to use the NEILSEN-taught plural focal length laser. There is no reasonable way to interpret this reference as teaching that the plural focal length approach of NEILSEN should be used in all instances. Additionally, there is no reasonable interpretation concluding that the specified thickness of the workpiece should be determined not by its ultimate intended use after cutting, but rather in order to produce minimum slag and increased cut quality.

As is evident from the very explicit teachings of NEILSEN, the plural focal length cutting laser is of particular benefit only in connection with thick steel workpieces, and such thick workpieces are those that are at least 15 mm in depth.

The ROLF reference fails to overcome this shortcoming of NEILSEN, as the ROLF reference does not concern itself with the thickness of the workpiece at all.

To the extent necessary, Appellant explicitly notes that claims 7 and 30, each of which recites a workpiece thickness in the range of 1.5 to 5 mm, should properly be considered independently of claims 1 and 22, respectively, from which claims 7 and 30 depend, and stand or fall independent of such independent claims.

The Examiner's Answer admits the particular intended limitation of the NEILSEN device to workpieces of at least 15 mm not only in the identified language of page 5 of the Examiner's Answer, but also on page 8 beginning on line 6 ("Nielsen '096 is directed to an improvement over a single-focus lens by using a multi-focus lens and an cutting gas to cut thick plates if stainless steel."); page 8, line 14 ("Neilson '096 uses a multi-focus lens instead of a single-focus lens because the multi-focus lens allows for cutting plates having a thickness of 15 mm or more"); and the sentence beginning on page 13, line 9 ("Neilson '096 is an improvement patent that uses a multi-focus lens instead of a single focus lens because the multi-focus lens allows for the possibility of cutting plates having a thickness of 15 mm or more").

Appellant maintains the position that the best indicator of what would be understood by skill in the art with respect to an applied reference is the author of such reference. The present prosecution provides the unique opportunity to know with certainty the thoughts and understandings of the inventor behind the applied NEILSEN reference, and we suggest that the stated affidavit indicating what one of skill in the art did think necessarily outweighs the conjecture of what one skilled in the art might think.

For all the reasons provided above, Appellant respectfully requests that the present rejections be reversed as to all claims, but if this is not the case, reversal of the rejection as to claims 7 and 30.

Respectfully submitted,

YOUNG & THOMPSON


Eric Jensen, Reg. No. 37,855
745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297
Telefax (703) 685-0573
(703) 979-4709

EJ/psf